

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BOARD OF PATENT APPEALS AND INTERFERENCES**

In Re Application of:

Martin, et al.

Group Art Unit: 1763

App. No.: 10/784,697

Examiner: Maureen G. Arancibia

Filed: February 23, 2004

Confirmation No. 1334

Docket No.: 62002-1752

For: METHOD AND APPARATUS FOR LOW ENERGY ELECTRON ENHANCED  
ETCHING OF SUBSTRATES IN AN AC OR DC PLASMA ENVIRONMENT

**RESPONSE TO NOTIFICATION OF NON-COMPLIANT  
APPEAL BRIEF (37 C.F.R. §41.37)**

Mail Stop: Appeal Brief - Patents  
Commissioner of Patents and Trademarks  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

This communication is in response to the Notification of Non-Compliant Appeal Brief, mailed February 7, 2007 (Part of Paper 20070131). As the appropriate correction to the Notification (MPEP 1205.03), Applicants submit the attached paper providing a summary of the claimed subject matter as required by 37 C.F.R. 41.37(c)(1)(v).

### **CONCLUSION**

Based upon the foregoing discussion, Appellant respectfully requests that the Notification of Non-Compliant Appeal Brief be withdrawn. Furthermore, Appellant respectfully requests that the Final Office Action rejecting claims 1, 2, 4-7, 9-11, and 16-26 be overruled and withdrawn by the Board and that the application be allowed to issue as a patent with all pending claims.

Respectfully submitted,

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## **V. SUMMARY OF CLAIMED SUBJECT MATTER**

Reference is made to a number of locations in the specification and figures with respect to summarizing the claimed subject matter as required by 37 C.F.R.

41.37(c)(1)(v). However, it should be understood that various related aspects of the present invention as described in the claims may be described elsewhere in the specification and figures as well.

The present application is directed to a method and apparatus for low energy electron enhanced etching of substrates in a AC or DC plasma environment. (Title; page 6, lines 16-24; page 7, lines 3-8). In accordance with the embodiment of independent claim 1, an apparatus for low-damage anisotropic electron dry etching of a substrate includes a plasma reactor (60; 70) for containing a plasma. (Page 12, Lines 17-24; page 16, line 17 to page 17, line 6; FIGS. 3-4). Further, a mechanical support (12) within the plasma reactor is adapted to receive the substrate (16), the mechanical support being isolated from the creation of the plasma. (Page 12, lines 25-27; FIG. 1). An additional structure (14) is disposed within the plasma reactor proximal to the mechanical support. (Page 14, lines 19-22; FIG. 1). At least a portion of the additional structure extends into the plasma at a time when the plasma reactor contains the plasma. (Page 15, lines 1-2; FIG. 1). A pulse waveform power source (21) is adapted to electrically bias the additional structure to direct the electrons from the plasma towards the substrate, the bias providing sufficient energy for the electrons to etch material from the substrate. (Page 15, line 2, to page 16, line 2; FIG. 1).

In accordance with the embodiment of claim 16, an apparatus for low-damage anisotropic low energy electron enhanced etching of a substrate (16) includes a plasma reactor (60; 70). (Page 12, lines 17-24; page 16, line 17 to page 17, line 6; FIGS. 3-4). The apparatus further includes a plasma creation means (e.g., 51, 54, 56; and 71, 72) at least partially disposed within the plasma reactor for creating a plasma having positively charged ions and electrons. (Page 16, line 16, to page 17, line 6; FIGS. 3-4). The apparatus further

includes a substrate holder (12) disposed within the plasma reactor for receiving a substrate, wherein the substrate holder is isolated from the plasma creation means. (Page 12, lines 25-27; FIGS. 3-4). The apparatus further includes electron etcher means (e.g., 19 and 26) for etching material from the substrate with electrons from the plasma, the electron etching means being in electrical communication with the substrate holder. (Page 13, lines 21, to page 14, line 18; FIG. 1). The apparatus further includes charged particle controller means (e.g., 14), disposed proximal to the substrate holder, for controlling the flux of charged particles directed from the plasma onto a substrate disposed on the substrate holder, the flux having sufficient energy for the electrons to etch material from the substrate. (Page 15, line 2, to page 16, line 2; FIG. 1).

In accordance with the embodiment of dependent claim 19, the apparatus of claim 16 further includes a pulse waveform power source (21) adapted to electrically bias the charged particle controller means to direct the electrons from the plasma towards the substrate. (Page 15, lines 2, to page 16, line 2; FIG. 1).